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Acanthohoplites reesidei (ANDERSON) from the Lower Cretaceous Sebayashi Formation, Japan

By

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Abstract *Acanthohoplites reesidei* (ANDERSON), from the Upper Member of the Sebayashi Formation of the Sanchu Terrane, Kwanto district, is described. This occurrence suggests that the Upper Member of the Sebayashi Formation is assignable to the uppermost Aptian, and provides an important evidence on early age of the third transgression in the Early Cretaceous of Japan.

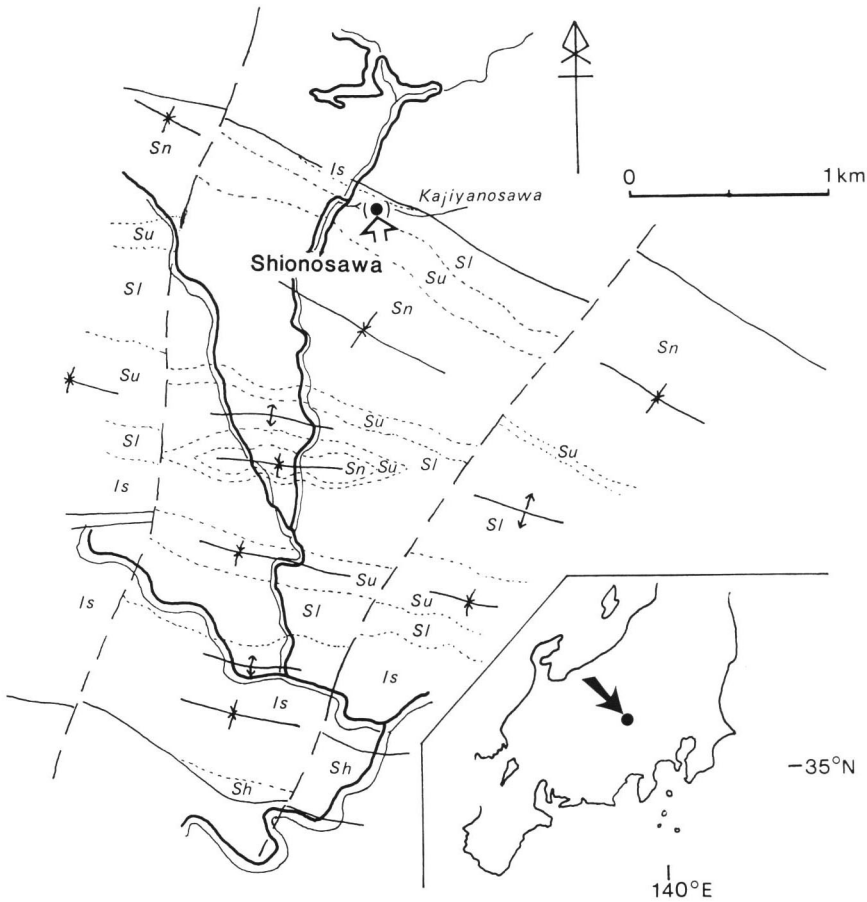
Introduction

Acanthohoplites reesidei (ANDERSON) is regarded as the zonal index of the uppermost Aptian in the northeast Pacific province (MURPHY, 1965; POPENOE *et al.*, 1960; JELETZKY, 1977).

Recently, this species was collected by I. TAMURA from the Upper Member of the Sebayashi Formation in the central part of the Sanchu Terrane. This occurrence contributes much to assignment of the uppermost Aptian for the Upper Member of the Sebayashi Formation, because the sequence from the Upper Member of the Sebayashi to Sanyama Formations has been barren of reliable ammonite indices. Thus the geological age of the correlative sequences in the outer side of Southwest Japan possibly be presumed and early age of the third transgression in the Early Cretaceous of Japan can be discussed. We give the palaeontological description on the ammonite from the Upper Member of the Sebayashi Formation.

Geological setting

The only one specimen was collected from a boulder of black sandy shale at Kajiyanosawa, north of Shionosawa-hamlet, Ueno-village, Gunma Prefecture (Text-fig. 1). The boulder is considered to be derived from the Upper Member of the Sebayashi Formation because of the black sandy shale: the Sebayashi Formation at the Kajiyanosawa is occupied by the Lower Member consisting of dark grey fine to medium grained sandstone and by the Upper Member of black sandy shale (MATSUKAWA, 1983).



Text-fig. 1. Geological sketch map of the central part of the Sanchu Terrane, indicating ammonite locality with (●) and derived direction from its mother formation with ⇧ (Adapted from MATSUKAWA, 1983). Geological formation, Sh: Shiroi Formation, Is: Ishido Formation, Sl: Lower Member of the Sebayashi Formation, Su: Upper Member of the Sebayashi Formation, Sn: Sanyama Formation.

Depository

The specimen is preserved in the Gunma Prefectural Museum of History, Takasaki.

Palaeontological description

Order Ammonoidea ZITTEL, 1884
Suborder Ancyloceratina WIEDMANN, 1960
Superfamily Deshayesitaceae STOYANOW, 1949

Family Parahoplitidae SPATH, 1922
Subfamily Acanthohoplitinae STOYANOW, 1949
Genus *Acanthohoplites* SINZOW, 1907
Type species: *Parahoplites aschiltaensis* ANTHULA 1899 by original designation.

Acanthohoplites reesidei (ANDERSON)

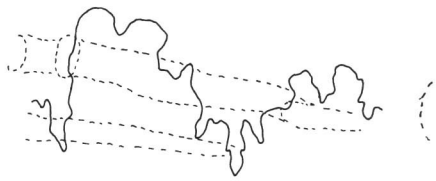
Text-figs. 2, 3

1938 *Cheloniceras reesidei*, ANDERSON, pp. 178–199, pl. 47, fig. 1.
1977 *Acanthoplites reesidei*, JELETZKY, p. 106 (listed), pl. 3, figs. 1a, b, c.

Material: GPM-GIII1h30, an imperfect internal cast of shell, collected by I. TAMURA. Test partly remains. The outer whorl of the specimen is partly flattened by crushing.

Description: The specimen is about 40 mm in diameter of shell. The shell is discoidal and evolute. The whorl section is rounded at the growth stage less than 10 mm in diameter of shell, then subelliptical at the stage above 10 mm, but is oblong, high and much compressed (B/H=0.48) at least above 27 mm with somewhat flattened flanks. The umbilicus is wide (U/D=0.36), shallow, and surrounded by relatively steep wall and slightly concave umbilical shoulder. The venter is slightly wide and nearly flat.

Text-fig. 2. *Acanthohoplites reesidei* (ANDERSON), from the Upper Member of the Sebayashi Formation, Upper Aptian. GPM-GIII1h30 (I. TAMURA coll.). Lateral (A), ventral (B) and diagonal (C) views, ×1.2.



(a)

(b)

Text-fig. 3. *Acanthohoplites reesidei* (ANDERSON). External suture-line of the Sanchu specimen, GPM-GIII1h30, at whorl-height of ca 4.4 mm (a) and 3.5 mm (b).

The whorl is ornamented with numerous rectiradiate ribs which are narrowly ridge-like. The ribs cross the venter and consist of primary and secondary ones. In the early whorl, the ribs consist of primary one arising from umbilical margin, and feeble secondary one appearing from mid flanks. In the mid-whorl, the primary ribs become to bear umbilical bullae and to bifurcate on weak lateral tubercles. One to three secondary ribs irregularly arise between two primary ribs. They do not bear umbilical bullae in the case of arising from umbilical margin, and make their appearance on the half or one-third flanks from the umbilical margin. In the late whorl, there are primary ribs only, and they do not bifurcate.

The suture line is rather simple (Text-fig. 3). Ventral lobe (E) is deep. Lateral lobe (L) is nearly as deep as but is broader than ventral one, showing subsymmetrically trifid lobules. Umbilical lobe (U) is much smaller than ventral and lateral lobes. The first lateral saddle is broader than ventral lobe, but is as broad as the lateral lobe, showing a subsymmetrically divided top but an asymmetrically sloped outline. The second lateral saddle is much lower than the first and rather deeply divided on the top.

Measurements (in mm):

Specimen	Diameter	Umbilicus	Height	Breadth	B/H
GPM-GIII1h30	41+				
	27.2(1)	9.9(0.36)	11.2		
			7.4	3.6	0.48

Remarks: The described specimen is closely similar to the illustrated specimen

of *Acanthoplites reesidei* (ANDERSON) (JELETZKY, 1977, pl. 3, fig. 1) from the Upper Aptian of British Columbia in its shell form, having primary and secondary ribs, bifurcating of the primary ribs on lateral tubercles in the mid-whorl, and having sometimes umbilical bullae on the primary ribs in the late whorl.

Acanthohoplites reesidei (ANDERSON) was described by ANDERSON (1938) as *Cheloniceras reesidei* (ANDERSON, 1938, pp. 178–179, pl. 47 fig. 1), but MURPHY (1956), POPENOE *et al.* (1960) and JELETZKY (1977) treated this species as *Acanthoplites reesidei* without discussion of the classification. Although *Acanthohoplites* was originally established by SINZOW (1907), this genus has been mistakenly spelled by some workers as *Acanthoplites*.

The Californian and Japanese specimens described by ANDERSON (1938) and us, and Canadian one illustrated by JELETZKY (1977) belong to the genus *Acanthohoplites* (WRIGHT, 1957, L. 386-L. 387) based on whorl shape and ornamentation: the whorl section shifts coronate as in *Cheloniceras* to subelliptical shape with growth; the ribs consist of primary and secondary ones; the primary ribs occur sometimes from umbilical bullae, and bifurcate at the lateral tubercles in the mid-whorl; the lateral tubercles disappear in late whorl and the bifurcations are located on umbilical edge or mid-flank.

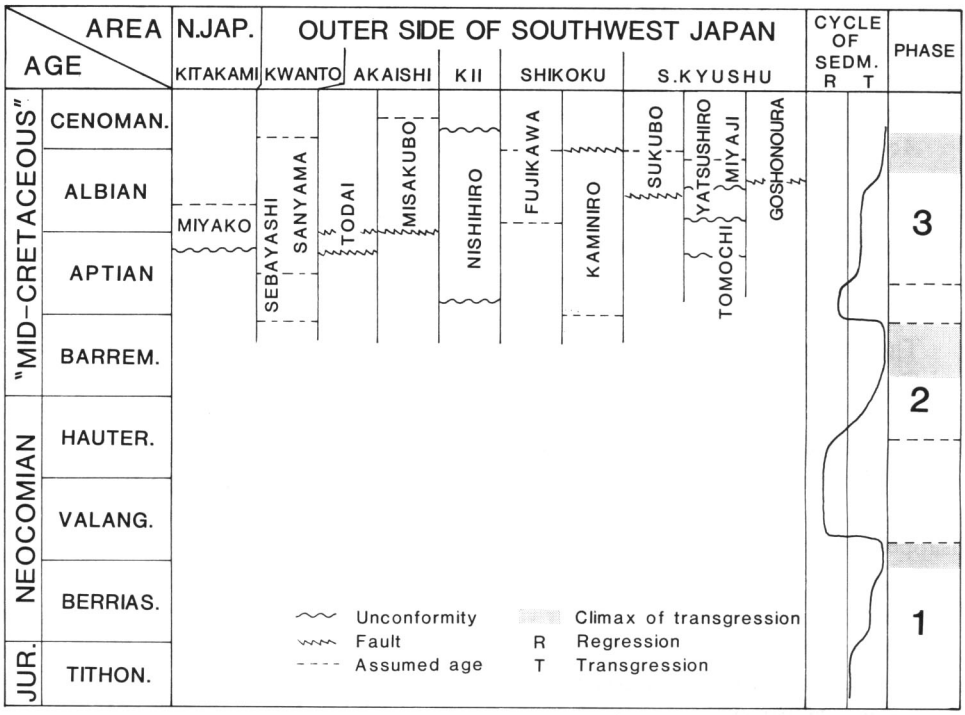
The genera grouped in the subfamily Acanthohoplitinae, *e.g. Nolaniceras* and *Hypacanthoplites*, are characterized by variable style of tubercles, their number, strength and duration (CASEY, 1965). Furthermore, at the specific level in the subfamily, the intraspecific variation is observed on the tuberculation. In *Hypacanthoplites subcornuerianus* (SHIMIZU), for example, two types of individuals are recognizable: ventrolateral tubercles are present or absent (OBATA and MATSUKAWA, 1980). Similarly, the three narrow, little but prominent tubercles on the primary ribs in early whorls described by ANDERSON (1938) may be an example of the variable features in *A. reesidei* (ANDERSON). Auxiliary elements of umbilical lobe in the subfamily Acanthohoplitinae are significant difference from others (CASEY, 1965). In the Japanese specimen, indeed, the beginning of auxiliary elements in the umbilical lobe (Text-fig. 3b) seems to be recognized although the preservation is imperfect.

The present specimen is distinguished from the illustrated specimens of *Parahoplites aschiltaensis* (ANTHULA, 1899, p. 117, pl. 10, figs. 2a-b, 3a-b, 4) from the Aptian of Caucasus in the ribbing: the former specimen has oblong whorl section after the mid-whorl and the irregular occurrence of zero to three secondary ribs between two primary ribs, but the latter has elliptical whorl section after the mid-whorl and has three or rarely two secondary ribs between two primary ribs.

Occurrence: See the description in the preceding chapter.

Stratigraphical significance of the occurrence of the present species

The sequence from the Upper Member of the Sebayashi Formation to its overlying Sanyama, consisting of monotonous black sandy shale, and being also poor in occurrence of ammonites, represents the third transgression in the Sanchu Terrane. The second and third transgressions in this sequence have been mentioned by MATSU-



Text-fig. 4. Correlation of Japanese Lower Cretaceous deposits under the third transgression.

KAWA (1983). The regressive phase between the second and third transgressions in this sequence is interpreted to show a regional sea-level change in comparison with the other sequences in Japanese Lower Cretaceous.

In the outer side of the Southwest Japan, for example, the Fujikawa and Kaminiro Formations in Shikoku deposited under the third transgression phase (MATSUKAWA and OBATA, 1987) and are as the same lithology as that of the sequence from the Upper Member of the Sebayashi to Sanyama Formations. These formations generally contain few ammonites (Table 1). The upper part of these sequences, including the sequence from the Upper Member of the Sebayashi to Sanyama Formations, yielded some Albian ammonites. The lower parts of these sequences, however, have been quite barren of ammonites. Furthermore, the precise age of regression phase after the second transgression characterized by many Barremian ammonites have not been able to be determined.

This occurrence of *A. reesidei* from the Upper Member of the Sebayashi Formation contributes to suggest the uppermost Aptian to the Upper Member and also to the beginning age of the third transgression. The Miyako Group and the Todai Formation, which include many late Aptian or early Albian ammonites, are of deposits un-

Table 1. List of ammonite species from the third transgression phase in the outer side of the Southwest Japan (Asterisk shows described species).

APTIAN

Sebayashi Formation (This stusy)

*Acanthohoplites reesidei**

Todai Formation (KITAMURA, MATSUKAWA, OBATA and MATSUMOTO, 1979)

Pseudohaploceras? sp., *Diodochoceras nodosocostatiforme*, *Hypacanthoplites subcornuerianus*, *H.* sp.

Tomochi Formation (MATSUMOTO, KANMERA and SAKAMOTO, 1968)

Diadochoceras sp. cf. *D. nodosocostatiforme**, *Eodouvilleiceras* n. sp. ? aff *E. horridum**

ALBIAN

Sanyama Formation (OBATA and MATSUKAWA, 1984)

Anagaudryceras sp. cf. *A. sacya**

Fujikawa Formation (YABE, 1927; NAKAI and MATSUMOTO, 1968; MATSUKAWA and ETO, 1987)

*Hypophylloceras yeharai**, *Desmoceras* (*Pseudouhligella*) *dawsoni shikokuense**, *Mortoniceras* (s.l.) sp.

Kaminiro (Hibihara) Formation (TASHIRO, KOZAI, OKAMURA and KATTO, 1980; MAEDA, 1987)

Hypophylloceras sp., *Anagaudryceras*? sp., *Tetragonites* sp., *Gaudryceras*? sp., *Hysteroceras* sp. aff. *H. carinatum*, *H.* sp. A, *H.* sp. B, *H.* sp., *Hamites* sp., *Pseudohelicoceras* sp., *Indohamites* sp., *Puzosia* sp., *Desmoceras* (*Pseudouhligella*) *dawsoni shikokuense*, *Eodouvilleiceras* sp., *Engoceras*? sp. aff. *E. stolleyi*, *Oxytropidoceras*? sp., *Mortoniceras* (*Deiradoceras*) sp., Lyelliceratid? indet., *Stoliczkaia* (*S.*) *dorsetensis**

Sukubo Formation (TASHIRO, TANAKA and MATSUDA, 1983)

Hamites sp. cf. *H. tenuicostatus*, *Idiohamites* sp. cf. *I. subspringer*, *I.* sp. cf. *I. farrinus*

Yatsushiro Formation (MATSUMOTO, KANMERA and OTA, 1980)

*Brewericeras enorme**, *Prolyelliceras*? sp.*, *Epileymeriella* sp. aff. *E. hitzeli**, *Platiknemiceras caseyi**

Goshonoura Group (MATSUMOTO and TASHIRO, 1975)

Mortoniceras (*M.*) sp. aff. *M. rostratum**

der the third transgression phase. The Misakubo Formation in Akaishi, the Nishihiro Formation in Kii, and the Sukubo, Tomochi, Yatsushiro and Miyaji Formations and the lower part of the Goshonoura Group in south Kyushu, also represent sediments of the third transgression phase in the Early Cretaceous.

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